2004 Integrated Pest Management Survey of California School Districts
Executive Summary

PURPOSE

The Department of Pesticide Regulation (DPR) surveyed all public school districts in California in April 2004. The purpose of the survey, conducted by DPR's Pest Management Analysis and Planning program, was to: (1) measure compliance with requirements of the Healthy Schools Act (HSA); (2) measure adoption of integrated pest management (IPM) policies; programs, and practices; (3) identify barriers to IPM adoption; (4) examine changes over time relative to prior surveys conducted in 2001 and 2002; and (5) relate demographic and geographic factors to survey responses. In addition, survey results and analyses will guide future IPM training efforts by DPR.

BACKGROUND

The HSA (enacted in 2001) aims to reduce exposure of children to pesticides in schools through the voluntary adoption of IPM and least-toxic methods of pest control. The law defines IPM as a means of preventing and suppressing pest problems using a combination of monitoring and recordkeeping, establishing pest thresholds, and non-chemical methods of pest management. Chemical controls that pose the least possible hazard to human health and the environment are used only after careful monitoring and pre-established thresholds and treatments indicate their use is necessary.

The law requires school districts to:

- Keep a registry of parents and guardians interested in notification of pesticide applications;
- Notify parents and guardians of specific pesticides applied in schools;
- Post signs on school grounds if pesticides are applied; and
- Keep records of pesticide applications for four years.

DPR is required to provide training to school district staff to facilitate the adoption of effective IPM programs and practices at school sites. DPR began with a pilot workshop in June 2002, followed by nine additional workshops held through June, 2004. A total of 232 school districts had been trained prior to completion of the 2004 SIPM survey.

DPR's 2001 (conducted before DPR training had begun) served as a baseline for all subsequent surveys (Tootelian, 2001), and also aided DPR's IPM training efforts.[i] Analysis of survey responses led to improvements in how the 2002 survey was conducted (Geiger and Tootelian, 2003).[ii] The 2004 survey was modified further for clarity and to collect additional information. This report describes the 2004 survey results and statistical analyses performed by scientists from the Institute for Social Research at California State University, Sacramento.

METHODOLOGY

Surveys were mailed to IPM coordinators of 972 school districts statewide in April 2004. The survey contained 24 questions grouped into four sections.

The first section contained questions about general pest management practices including the district's compliance with HSA requirements, adoption of IPM policies, programs and practices, and barriers to using IPM in a school district. The next two sections focused on ant and weed management methods used by the districts. The last section contained questions regarding respondent information and determined pest management responsibilities and general job classification.

Responses to individual questions were compiled and relationships among these questions and district characteristics quantified. Trends in response rates occurring since 2001 were also analyzed. In addition, multiple questions concerning IPM policies and practices were reduced to six scale scores so it would be easier to compare responses. The six scales measure a school district's:

1) HSA compliance
2) IPM program
3) Awareness of IPM information resources
4) Use of IPM information resources
5) Ant management practices
6) Weed management practices

The first four scales are simple numerical summations of the number of policies, activities or resources a district has adopted, engaged in, or used.

The ant and weed management scales are more complex, involving weighted combinations of specific management practices. Univariate and multivariate analyses were used to identify relationships among these scales, IPM program adoption, district and respondent characteristics, as well as perceived barriers to implementing IPM.

RESULTS

Survey Response Rate

The survey response rate was 55% (533 of 972 school districts returned the survey), an increase from 39% and 42% in the 2001 and 2002 surveys, respectively. Although the initial response rate was similar to prior years, a second mailing was employed and improved the response rate by more than 10 percentage points.

HSA Compliance and the Adoption of IPM Policies and Practices

Almost all school districts post warning signs (92%) and provide written notification of pesticide use (88%). Seventy-nine percent keep a registry and 77% keep pesticide use records up to four years. Approximately two-thirds (64%) comply with all four of these HSA requirements, while another 22% complied with three of the four. Only 5% of districts had failed to comply with any of the Act's requirements. However, some of the "non-compliant" districts are exempt from the Act's requirements because they do not use pesticides.

In contrast, fewer districts use general IPM practices that are associated with the voluntary aspects of the law. Between 31% and 67% have written policies regarding pesticide use and pest management while recordkeeping and pest monitoring activities range from 25% to 88%. School districts are therefore much more likely to comply with the mandatory requirements in the HSA, than they are to adopt IPM-related policies or practices that are voluntary.

HSA compliance is greater in districts that have adopted an IPM program and have higher scores on the IPM program scale—activities related to the requirements of the HSA and incorporate what districts define as an IPM program. In contrast, compliance actually decreases with increasing costs per student—a function, perhaps, of the greater costs of educating children in rural areas and the lower HSA compliance rates of rural districts. Use of IPM information resources is also strongly related to higher scores on the HSA compliance scale, particularly for districts that have not adopted an IPM program. Together, these four variables explain almost a third of the differences in HSA scores.

Trend: *DPR's School IPM training program, Web site and brochures have successfully encouraged significant improvement in compliance with each of the four HSA requirements between 2002 and 2004. Mean scores on the HSA scale increased significantly, reinforcing this trend.*

Adoption of district policies supportive of IPM also increased significantly over this two-year period. Districts were more apt to maintain a list of pesticide products approved for use in their schools in 2004 and many also had a written policy requiring use of the least-toxic pest management practices.

IPM Program Adoption

Districts are more likely to adopt IPM-related policies, monitor pest levels, and keep records of pest monitoring and treatments if they have adopted an IPM program, have higher average daily attendance (ADA) and greater compliance with the HSA. The data presented here may understate the existence of IPM policies and practices since one in seven respondents was not the district's IPM coordinator and IPM coordinators were more aware of policies and practices associated with the HSA than non-coordinators.

Region, type of district, and ADA are all significantly related to adoption of an IPM program. Districts in the Central Coastal region and unified school districts are much less likely and high schools much more likely to have adopted an IPM program. Size—measured by either ADA or the number of schools in a district—increases the likelihood of program adoption. Size also affects how long such a program has been in effect. Larger school districts tended to be the early adopters while smaller districts are more apt to have instituted their IPM program in the past two years.

A lack of resources also strongly affects the ability of a school district to adopt an IPM program. School districts where understaffing and staff training were perceived as very significant barriers to using IPM practices were less likely to adopt an IPM program.

Districts with an IPM program are much more likely to have a written policy requiring the use of least-toxic pest management practices and a written list of approved products than those without one. However,

all districts, with or without an IPM program, are less apt to have a written policy requiring the monitoring of pest levels. In addition, districts with an IPM program are more likely to keep records of pest sightings and treatments, and inspect and monitor for pests, than those without an IPM program.

Trend: *Recordkeeping and pest monitoring have improved markedly over the three survey years. 79% of school districts kept records of pest treatments used in 2001, with increases to 86% and 88% in 2002 and 2004. The greatest change occurred in the proportion of districts that kept records of pest sightings (that is when pests were first found), from 11% in 2001 to 55% in 2004. Over the same period, there was a more modest increase in the proportion of school districts that recorded the results of pest monitoring efforts.*

Almost half of all respondents in 2004 felt their IPM program resulted in more effective pest management, a significant increase from 41% in 2002.

Ant Management Practices

Over four-fifths of school districts did something to manage ants inside school buildings within the 12 months before the 2004 survey. IPM-based ant management practices occur more often in districts that have adopted an IPM program and score highly on the IPM policy, monitoring and recordkeeping scale. The most common practices used to manage ants inside school buildings were improved sanitation (80%) and ant baits (69%). Only 16% reported use of an insecticide spray from an aerosol can. However, pesticide-based practices are still seen as very effective; respondents were more likely to identify non-aerosol and aerosol insecticides as "very effective" than any other ant management practice.

Trend: *Ant baits and insecticidal sprays were used by more school districts in 2001 than any other practice. The use of insecticidal sprays dropped in 2002 and 2004, while the use of ant baits, soapy water sprays, caulking and improved sanitation increased in each successive survey year. When asked which method was used* ***most frequently*** *to manage ants inside school buildings, respondents indicated that, in 2001, insecticides were the most common—a number that was halved in the 2002 and 2004 surveys. Ant baits became the method of choice in the two later surveys with improved sanitation the only other widely preferred single method of managing ants.*

Weed Management Practices

Weed management is commonplace in California schools. A third of the districts rely upon an IPM-based method for weed management but a large proportion of respondents do not perceive these methods as "very effective".

A majority of districts still depend upon pesticide-based methods. In particular, school districts in North Central and the Central Valley regions were less likely to use IPM-based weed management practices. IPM-based practices occurred more often in school districts with higher average costs per ADA.

Trend: *In 2001, nearly one-third of all school districts identified athletic fields and playgrounds (combined) as the single most common area for problems with weed management. In 2002 and 2004 that dropped to 22% and 12%, respectively. In 2001, the most frequently used practices for managing weeds were spot treatment with herbicides and physical controls such as hand pulling, cultivating, and mowing. Physical controls and spot treatment with herbicides remain the single most common practice in 2004, but over half of all districts also use mulches, while slightly less than half use irrigation management, and even fewer, broadcast treatment with herbicides and turf selection.*

Fencerows (30%) and landscaping (25%) were reported as the single most common locations where districts had trouble with weeds. Relatively few respondents mentioned athletic fields (9%) and playgrounds (3%)—locations receiving significant attention in DPR's workshops and surveys. The practices used most frequently to manage weeds in these locations were spot treatment with herbicides (40% for athletic fields and 48% for playgrounds) and physical controls (35% for athletic fields and 34% for playgrounds). However, about one-third of the districts view the IPM related practices for weed management as "very effective" while 77% and 59% view spot and broadcast treatments, respectively, in this way.

Barriers to Using IPM Practices

Middle-sized school districts were more apt to experience four barriers to using IPM practices in their school districts: poor communication, budget restrictions, understaffing and a lack of technical information resources. Similarly, budget restrictions and inadequate staff training are more of a problem for districts with average costs per ADA. In contrast,

understaffing becomes a less significant barrier as costs per ADA increase.

The perceived barriers to using IPM practices were strongly related to scores on three scales: specifically, those measuring HSA compliance, IPM programs, and ant management. Respondents from districts that score significantly lower on these three scales describe inadequate staff training, understaffing, insufficient tool/equipment inventory and a lack of technical information resources as "somewhat" or "very significant" barriers.

These findings suggest several ways in which DPR can assist school districts in adopting IPM practices. For districts where understaffing constitutes a significant barrier, DPR could develop less labor-intensive IPM methods or help prioritize pest control needs. DPR can also help districts with staff training and expand its efforts to distribute technical information.

Pest Management Information Resource Awareness and Use

Resources used most often by IPM coordinators are DPR's brochures and School IPM Web site, followed by information provided by licensed pest control businesses, and training workshops on school IPM. The most important predictor of use of IPM information resources is participation in DPR training. Respondents from districts that had participated in DPR training were significantly more likely to have used information resources.

In general, respondents from rural areas– and the North Coast in particular—were less aware of and less apt to use IPM information resources, while those representing larger districts, high school districts, and districts that had participated in DPR's IPM training were much more aware and more likely to have used this information.

IPM coordinators were more aware of IPM information resources than respondents who did not serve in this capacity. The coordinators' awareness and use increased with tenure in the job. Respondents in administrative positions were less aware of the resources and were less likely to use the resources than respondents in other positions. Manager/supervisors of maintenance and operations staff were the real experts in using information resources. They were more likely than the director/coordinators to use information resources, especially when neither served as the IPM coordinator.

Major Findings and Conclusions

Description of 2004 IPM Policies and Practices

- School districts are much more likely to comply with the requirements of the HSA, which are mandatory, than they are to adopt IPM-related policies or practices, which are voluntary.
- Almost two-thirds of the school districts had complied with four requirements of the Act, while another 22% had complied with three of the four. Only 5% of districts had failed to comply with any of the Act's requirements. However, some of the "non-compliant" districts are exempt from the Act's requirements because they do not use pesticides.
- At least 70% of California's school districts have adopted an IPM program.
- Districts that have an IPM program are much more likely to have a written policy requiring use of the least-toxic pest management practices and a written list of approved products. They are also much more likely to keep records of pest treatments used (95%), inspect buildings for potential pest problems (66%) and monitor pests during the course of a year (60%).
- School districts use IPM-based ant management practices more frequently than IPM treatments for weeds.
- In 2004, the most common practices used to manage ants inside school buildings were improved sanitation (80%) and ant baits (69%).
- Despite improved practices, respondents identified insecticides as "very effective" more often than any other ant management practice.
- A majority of districts still depend upon pesticide-based weed management practices.
- Fencerows and landscaping were the most common locations where districts had trouble with weeds. In contrast with prior surveys, relatively few respondents mentioned athletic fields and playgrounds—locations receiving greater attention in DPR's IPM training program.
- Resources used most often by IPM coordinators are DPR's brochures and school IPM Web site, followed by information provided by licensed pest control businesses and DPR's training workshops.

Relationships between District Characteristics and IPM Policies and Practices

This study determined that there are significant relationships between district characteristics and IPM policies and practices.

Larger school districts are more involved with IPM. This may be due to their early involvement in DPR's training workshops. Specifically, they are more likely to:

- Adopt an IPM program.
- Adopt IPM-related policies, monitor pest levels and keep records of pest monitoring and treatments.

Two other characteristics related to district size are associated with greater IPM involvement.

- Unified school districts are more likely than elementary districts to have adopted an IPM program.
- Urban districts are more likely than certain rural districts to utilize IPM-compatible ant management practices.

Regional differences were generally found to be less important than other district characteristics.

- Districts in the Central Coast region are less likely to adopt an IPM program.
- Districts in the North Central and Central Valley regions are less likely to use IPM-compatible weed management practices.

Districts that have adopted an IPM program are:

- More compliant with the HSA;
- More likely to adopt IPM-related policies, monitor pest levels and keep records of pest monitoring and treatments; and
- More likely to use IPM-compatible ant management practices.

Pest Management Information Resources

Using pest management information resources—including the DPR School IPM Web site and DPR presentations and training—is associated with greater commitment to IPM. School districts that use more information resources are more likely to:

- Adopt an IPM program;
- Be in compliance with the HSA; and
- Adopt IPM-related policies, monitor pest levels and keep records of pest monitoring and treatments.

Barriers to Using IPM

Only two barriers to using IPM practices, understaffing and inadequate training, were strongly related to district IPM practices and policies. Districts that describe understaffing as a very significant barrier to using IPM practices are less likely to:

- Adopt an IPM program or IPM-related policies;
- Monitor pest levels and keep records of pest monitoring and treatments; and
- Use IPM-compatible ant management practices.

Districts that describe inadequate staff training as a very significant barrier to using IPM practices are less likely to have adopted an IPM program.

Progress in Implementing IPM: 2001 - 2004 Trends

A trend analysis of three survey years (2001, 2002 and 2004) indicates that significant progress has occurred in complying with the requirements of the HSA and meeting the goal of increasing IPM policies and practices in California's school districts.

- Compliance with each of the four HSA requirements increased between 2002 and 2004. Adoption of district IPM policies increased significantly over this two-year period.
- In 2004, districts were more apt to maintain a list of approved pesticide products and to have a written policy requiring use of the least-toxic pest management practices. Twice as many districts had introduced a policy of requiring the monitoring of pest levels.

More respondents in 2004 also felt that their IPM program had resulted in more effective pest management, although there was no change in the proportion that felt it had reduced the long-term cost of pest management.

Recordkeeping and pest monitoring activities improved markedly over the three survey years. Maintaining records of pest sightings jumped from 11% to 55% while recording the results of pest monitoring increased from 15% to 25% of all districts. Recording pest treatments used was already widespread in 2001 (79%), but other districts have adopted this practice, raising the percentage to 88% in 2004.

Most importantly, ant management practices have dramatically improved. Ant baits and insecticidal sprays were the most common practices in 2001. Ant baits became the method of choice in the later surveys with improved sanitation the only other widely preferred single method of managing ants. The use of insecticidal sprays as the most frequently used method of managing ants inside school buildings was halved between 2001 and the two later surveys.

Future Training Recommendations

The 2004 survey findings suggest that assistance with IPM program adoption, written IPM policies, and monitoring and recordkeeping activities would be helpful to schools in adopting both the mandatory and voluntary aspects of the HSA. The location where weeds cause the most problems for schools has shifted to fencerows and landscaped areas. School districts need further training in IPM for weeds, particularly in those locations. In addition, information on the costs of implementing IPM, less labor-intensive IPM methods, and prioritizing pest control needs would help school districts facing budgetary and staffing constraints. Finally, the focus of past DPR training efforts had logically been in areas with the highest density of schools and school districts. As these communities become better educated and more aware of training resources, more emphasis on training for smaller districts in more rural areas may be warranted since results indicate DPR training is associated with greater commitment to IPM.

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[i] Tootelian, D.H. (2001). 2001 Integrated Pest Management Survey of California School Districts. Sacramento, CA, California Department of Pesticide Regulation.

[ii] Geiger, C.A. and D.H. Tootelian (2003). 2002 Integrated Pest Management Survey of California School Districts. Sacramento, CA, California Department of Pesticide Regulation.